

CHAPTER V

CONCLUSIONS AND FUTURE WORK

5.1 Conclusions

The effects of calcium carbonate nanosize filler were studied on properties of natural rubber. The work was also to prepare the natural rubber filled with nanocalcium carbonate, conventional calcium carbonate (particle size of 2 μ m) and conventional reinforcement fillers (carbon black and silica). The mechanical properties were investigated and compared as follows:

1. The mechanical properties of nanocalcium carbonate increased with increasing filler loading. They were also higher than that of 2 μ -calcium carbonate composite at same loading because of the smaller particle size and larger surface area. Thus, the interaction between filler and rubber was improved.
2. For the uncoated nanocalcium carbonate composite, the mechanical properties were slightly affected because the smaller size filler is poorly dispersed in rubber matrix. However, the mechanical properties were higher than those of 2 μ -calcium carbonate composites, which could be also confirmed by SEM micrographs.
3. The rubber filled with nanocalcium carbonate and white conventional reinforcement filler (silica) were compared. It was found that the curing time of silica composite was high because of silanol group.
4. The reinforcement of carbon black in rubber was obviously high but the elasticity of rubber was lost, because of the strong interaction between functional group on carbon black and rubber. Thus, the coated nanocalcium carbonate exhibited the reinforcing effect while retained the elasticity of the elastomer, which is very useful for the color rubber application.

5.2 Future Work

Future improvement on mechanical properties of the nanocalcium carbonate filled rubber will be made on the following aspects.

- To prepare the different rubber matrix with nanocalcium carbonate.
- To prepare the nanocalcium carbonate by dispersing and mixing it in rubber latex for more effective dispersion.